Claims:

What is claimed is:

1. A nonwoven fabric, said fabric comprising a continuous web of substantially endless thermoplastic melt extruded filaments having a denier of about 0.5 to 3, wherein said filaments are hydroentangled in the form of interengaged packed loops, with the filaments being substantially free of breaking, wrapping and knotting.

2. A nonwoven fabric as in claim 1, wherein said filaments have a denier of about 1.0-2.5.

3. A nonwoven fabric as in claim 1, wherein said thermoplastic melt extruded filaments comprise polyolefins, polyamides, or polyesters.

4. A nonwoven fabric as in claim 1, wherein said nonwoven fabric has a basis weight of between about 20 and 450 g/m^2.

5. A nonwoven fabric as in claim 1, further comprising secondary component filaments comprising between 5% and 95% by weight of the fabric, and where said secondary fibers are chosen from the group comprising staple polymer fibers, wood pulp, synthetic pulp, or meltblown filaments.

6. A nonwoven fabric as in claim 1, wherein said fabric having a surface treatment chosen from the group comprising: wetting agents, surfactants, fluorocarbons, antistats, antimicrobials, binders, and flame retardants.

7. A nonwoven fabric as in claim 1, wherein said fabric comprises an article chosen from the group comprising: an absorbent article, industrial apparel, medical apparel, medical fabric, agricultural fabric, recreational fabric, upholstery, and durable apparel.

8. A nonwoven fabric as in claim 1, wherein said fabric has a machine direction elongation value of at least 75%, and a cross direction elongation value of at least 100%.

9. A nonwoven fabric as in claim 1, wherein said fabric has a fiber entanglement frequency of at least 10.0, and a fiber entanglement completeness value of at least 1.00.

10. A nonwoven fabric as in claim 1, wherein said fabric has a fiber interlock value of at least 15.

11. A nonwoven fabric as in claim 1 wherein said continuous web of substantially endless thermoplastic filaments comprises a plurality of layers of said continuous filaments.

12. A nonwoven fabric as in claim 1 wherein said inter-engaged packed loops provide a structure wherein cross direction elongation is directly proportional to cross directional tensile strength.

13. A non-woven fabric comprising a continuous web of substantially endless melt extruded thermoplastic filaments having a denier of about 1.0 to 2.5, wherein said filaments are hydroentangled in the form of interengaged packed loops, with the filaments being substantially free of breaking, wrapping, and knotting; said fabric having a basis weight of between about 20 and 450 gm/m^2, having a machine direction elongation value of at least 75% and a cross direction value of at least 100%, having a fiber entanglement frequency of at least 10.0, a fiber entanglement completeness value of at least 1.00, a fiber interlock value of at least 15.

14. A method for producing a nonwoven fabric, said method comprising the steps of:

a) continuously melt extruding a thermoplastic polymer into a plurality of endless filaments having a denier of between about 0.5 to 3.0 to provide an unbonded web; and

b) continuously and without interruption, supporting said web on a moving porous support while subjecting said web to hydraulic entanglement by at least one successive water jet station comprising a plurality of water jets at successively higher hydraulic pressures to produce a bonded continuous web of continuous filaments.

15. A method of producing a nonwoven fabric as in claim 14, wherein said filaments have a denier of between about 1-2.5.

16. A method of producing a nonwoven fabric as in claim 14, wherein said bonded continuous web has a packed interengaged filament loop configuration substantially free of wrapping and knotting.

17. A method of producing a nonwoven fabric as in claim 14, wherein said moving support is chosen from the group comprising a dual wire, forming drum, and a single wire.

18. A method of producing a nonwoven fabric as in claim 14, wherein said moving support has a three dimensional surface.

19. A method of producing a nonwoven fabric as in claim 14, wherein said thermoplastic polymer filaments are chosen from the group comprising polyolefins, polyamides, and polyesters.

20. A method of producing a nonwoven fabric as in claim 14, wherein said fabric is hydroentangled at substantially the same rate as said filaments are extruded.

21. A method of producing a nonwoven fabric as in claim 14, wherein said fabric having a basis weight of between about 20 and 450 g/m^2.

22. A method of producing a nonwoven fabric as in claim 14, wherein said hydroentangling jets are from 1-3 inches from said filaments.

23. A method of producing a nonwoven fabric as in claim 14, wherein each successive of said plurality of water jets is directed at an opposite side of said web from previous of said plurality of jets.

24. A method of producing a nonwoven fabric as in claim 14, further comprising the additional step of adding secondary component fibers to said web comprising between 5% and 95% by weight of said fabric, said fibers chosen from the group comprising short staple polymer fibers, wood pulp, synthetic pulp, and meltblown filaments.

25. A method of producing a nonwoven fabric as in claim 14, wherein said unbonded web comprises two or more layers of said substantially endless filaments.

26. A method of producing a nonwoven fabric as in claim 14, wherein said at least one successive water jet stations comprise at least one pre-entanglement station at a preliminary hydraulic pressure and at least one entanglement water jet station at an entangling hydraulic pressure.

27. A method of producing a nonwoven fabric as in claim 26, wherein said at least one pre-entangling jet station comprises from 1-4 water jet stations, each of said stations

having a plurality of jets with an orifice of 0.004-0.008 inches, said preliminary hydraulic pressures are between about 100-5000 psi, and said at least one entangling jet station comprise from 1-4 jet stations, each having a plurality of jets having an orifice of 0.004-0.008 inches, and said entangling hydraulic pressures are between about 1000-6000 psi.

28. A method of producing a nonwoven fabric as in claim 26, wherein said fabric has a basis weight of less than about 50 g/m^2, and said preliminary hydraulic pressures are between about 100 and 800 psi, and said entangling hydraulic pressures are between about 1000-2000 psi.

29. A method of producing a nonwoven fabric as in claim 26, wherein said fabric has a basis weight of greater than 50 g/m^2, and said preliminary hydraulic pressures are between about 100-5000 psi, and said entangling hydraulic pressures are between about 3000-6000 psi.

30. A method of producing a nonwoven fabric as in claim 26, further comprising imparting a pattern on said fabric by entangling said filaments against a pattern forming member with patterning water jets having a patterning hydraulic pressure.

31. A method of producing a nonwoven fabric as in claim 30, wherein said pattern forming member comprises a forming belt or a forming drum.

32. A method of producing a nonwoven fabric as in claim 30, wherein said patterning hydraulic pressure is between about 2000 to 6000 psi.

33. A method of producing a nonwoven fabric as in claim 30, wherein said fabric has a basis weight of less than about 50 g/m^2, and said patterning hydraulic pressure is between about 2000 to 3000 psi.

34. A method of producing a nonwoven fabric as in claim 30, wherein said fabric has a basis weight of greater than about 50 gm/m^2, and said patterning hydraulic pressure is between about 3000 to 6000 psi.

35. A method of producing a nonwoven fabric, said method comprising the sequential steps of:

a) continuously melt extruding substantially endless polymer filaments onto a moving support to form an unbond web of filaments, said filaments having a denier of about 1-2.5;

b) continuously and without interruption pre-entangling said filaments with from one to four pre-entangling water jet stations having a pre-entangling hydraulic pressure of between about 100 and 6000 psi; and then

c) entangling said filaments to form a packed interengaged loop configuration of filaments substantially free from knotting, wrapping, and breaking, with from one to four entangling water jet stations at an entangling hydraulic pressure of between about 1200 and 6000 psi to form a coherent web.

36. An apparatus for producing a nonwoven fabric, comprising:

a) a means for continuously melt extruding one or more layers of an unbond web of substantially endless thermoplastic polymer filaments, said filaments having a denier of between about 0.5 - 3;

b) a moving porous support for supporting said web; and

c) at least one water jet entanglement station for continuously and without interruption entangling said web with water streams of an entanglement hydraulic pressure to form a coherent web.

37. An apparatus as in claim 36, wherein said means for depositing filaments comprises an extruder having means for spinning continuous filaments, said filaments have a denier of between about 1. and 2.5.

38. An apparatus as in claim 36, wherein said moving support means is chosen from the group comprising a single wire, a dual wire, and a forming drum.

39. An apparatus as in claim 36 wherein said moving support having a three dimensional surface.

40. An apparatus as in claim 36, wherein said entanglement hydraulic pressure is between about 100 and 6000 psi.

41. An apparatus as in claim 36, wherein said entangling jets result in said filaments having an interengaged packed loop entanglement substantially free from knotting, wrapping, and breaking.

42. An apparatus as in claim 36, further comprising means for adding a second component filament to said web.

43. An apparatus as in claim 36, further comprising at least one pre-entanglement water jet station comprising a plurality of pre-entanglement water jets for continuously and without interruption pre-entangling said filament web with water streams of a pre-entanglement hydraulic pressure, said pre-entanglement water jet pressure being less than or equal to said entanglement hydraulic pressure.

44. An apparatus as in claim 43, wherein said at least one pre-entanglement water jet stations comprise from one to four water jet stations, and said pre-entanglement hydraulic pressure is between about 100 and 5000 psi, and said entanglement hydraulic pressure is between about 1000 and 6000 psi.